Appl. No.: 10/814,419
Amdt. Dated: 04/12/2006
Off. Act. Dated: 01/12/2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended): A system for detecting ~~proximity~~ motion of a wireless device operating within a wireless network, comprising:

a first network device configured for wirelessly communicating beacon frames, which include signal strength information, with at least a second network device; [[and]]

~~means for detecting proximity motion in response to signal strength regression analysis when said first network device is moved within the proximity of the second network device.~~

a motion monitoring module configured for continuously monitoring signal parameters within the beacon frames when said first network device is moved within a proximity of said second network device;

a regression analysis module configured for performing a regression analysis of signal strengths; and

a motion detection module configured for comparing an output of the regression analysis module against a threshold to determine whether said first network device and said second network device have moved in or out of proximity with one another within a given time interval.

2. (currently amended): A system as recited in claim 1, wherein said regression analysis is performed without regard to transmit power of said first network device.

~~means for detecting proximity motion comprises:~~

~~a motion monitoring module configured for continuously monitoring signal parameters within beacon frames;~~

~~a regression analysis module configured for performing a regression analysis of signal strengths; and~~

~~a motion detection module configured for comparing the output of the regression analysis against one or more thresholds to determine whether proximal motion has occurred.~~

3. (currently amended): A system for detecting ~~proximity~~ motion of a wireless device operating within a wireless network, comprising:

a first network device configured for communicating wirelessly with at least a second network device; [[and]]

a computer processor with programming executable on said computer for,

~~means for~~ communicating beacon frames containing signal strength information between said first network device and the second network device;

~~means for~~ performing a signal strength regression analysis on received signal strength information; and

~~means for~~ generating a proximity motion detection signal in response to said signal strength regression analysis performed during close proximity relative motion between said first network device and [[the]] said second network device within a given time interval.

4. (currently amended): A system as recited in claim 3, wherein said regression analysis is performed without regard to transmit power of the first network device ~~further comprising a media access control module for dispatching beacon frames to wireless devices in the wireless network~~.

5. (currently amended): A system as recited in claim [[4]] 3, wherein said beacon frame is an IEEE 802.11 network formatted data frame.

Appl. No.: 10/814,419
Amdt. Dated: 04/12/2006
Off. Act. Dated: 01/12/2006

6. (currently amended): A system as recited in claim 3, wherein said ~~means~~ programming ~~for communicating beacon frames comprises~~ is configured for transmitting beacon frames from said first network device acting as a sending wireless device for receipt by the second network device acting as a receiving wireless device, or from [[the]] said second network device acting as a sending wireless device for receipt by said first network device acting as a receiving wireless device.

7. (currently amended): A system as recited in claim [[6]] 3:

wherein said ~~means~~ programming is configured for accumulating a plurality of signal strength measurements for said regression analysis ~~for communicating beacon frames comprises a motion monitoring module operating in combination with a beacon detection module~~;

~~wherein said motion monitoring module continuously monitors signal strength parameters in beacon frames~~.

8. (currently amended): A system as recited in claim [[7]] 6, wherein said ~~motion monitoring module~~ programming continuously monitors beacon frames ~~frame beacons~~ transmitted by the sending wireless device to the receiving wireless device at a predetermined transmission interval.

9. (currently amended): A system as recited in claim 8, wherein said predetermined transmission interval is at or less than approximately 100 milliseconds [[(mS)]].

10. (currently amended): A system as recited in claim [[7]] 6, wherein said ~~beacon frame detection module~~ programming tunes [[the]] an interval frequency for transmitting the beacon frames between [[a]] the receiving wireless device and [[a]] the sending wireless device.

Appl. No.: 10/814,419
Amdt. Dated: 04/12/2006
Off. Act. Dated: 01/12/2006

11. (currently amended): A system as recited in claim [[6]] 3, wherein said ~~means~~ programming ~~for performing a signal strength regression analysis~~ is configured to detect motion in response to a defined signal strength change within the given time interval ~~comprises a signal strength regression analysis module configured for regressively analyzing the difference in signal strength between the sending wireless device and the receiving wireless device as the sending wireless device proximately motions towards the receiving wireless device~~.

12. (currently amended): A system as recited in claim 11, wherein motion is detected if said signal strength change of approximately 20 dB arises within less than or equal to a time interval of approximately one second ~~regression analysis module is configured for analyzing the difference in signal strength for a recorded set of signal information retained by said receiving wireless device in order to determine whether said sending wireless device is in proximity motion to said receiving wireless device~~.

13. (currently amended): A system as recited in claim [[12]] 3, wherein said ~~signal strength regression analysis module~~ programming is configured for calculating a regression coefficient of the difference in the signal strength in response to accumulating a plurality of signal strength measurements ~~of the recorded set of signal strengths~~.

14. (currently amended): A system as recited in claim [[13]] 3, wherein the signal strength regression analysis ~~module~~ programming is configured to calculate a coefficient of determination in the signal strength for a plurality of accumulated signal strength measurements ~~the recorded set of signal strengths~~.

Appl. No.: 10/814,419
Amdt. Dated: 04/12/2006
Off. Act. Dated: 01/12/2006

15. (currently amended): A system as recited in claim 14;

wherein said programming is configured for calculating a regression coefficient of the difference in the signal strength; and

wherein said proximity motion is detected in response to determining that ~~between said sending wireless device and said receiving wireless device, when~~ the regression coefficient is approximately equal to the quotient of the increase in the signal strength divided by the ~~set of recorded~~ accumulated signal strengths and the coefficient of determination.

16. (currently amended): A system as recited in claim [[15]] 14, wherein said proximity motion is detected in response to calculating a regression coefficient and determining that ~~for said sending wireless device is detected in response to~~ the coefficient of determination exceeds ~~exceeding~~ the regression coefficient.

17. (currently amended): A system as recited in claim 15, wherein said increase in the signal strength is pre-calibrated prior to performing said regression analysis on said accumulated ~~the set of recorded~~ signal strengths.

18. (currently amended): A method of detecting ~~proximity~~ motion between ~~two wireless devices~~ a first wireless device at a fixed location and a second wireless device that is mobile, comprising:

~~maneuvering a second mobile wireless device in relation to a first, fixed location, wireless device within a given proximity range;~~

continuously monitoring the strength of signals transmitted between said first ~~target~~ wireless device and said second ~~mobile~~ wireless device as a mobile device that is configured for moving toward ~~said second wireless device moves towards~~ said first wireless device; ~~and~~

regressively analyzing said monitored signal strength; and ~~to determine the~~

Appl. No.: 10/814,419
Amdt. Dated: 04/12/2006
Off. Act. Dated: 01/12/2006

detecting proximity motion of said second ~~mobile~~ wireless device with respect to said first ~~target~~ wireless device in response to said regression analysis performed over a given time interval ~~to determine whether a given proximity range is achieved~~.

19. (currently amended): A method as recited in claim 18, wherein the ~~given~~ proximity range is less than or equal to approximately ~~about~~ 15 centimeters.

20. (currently amended): A method as recited in claim 18, wherein the ~~given~~ proximity range is less than or equal to approximately ~~about~~ 5 centimeters ~~or less~~.

21. (currently amended): A method as recited in claim 18, wherein said detecting proximity motion is performed with no dependence ~~further comprising estimating the relationship between said second mobile wireless device and said first target wireless device without being dependent~~ on the type of said second ~~mobile~~ wireless device ~~to maintain~~ toward maintaining compatibility in a heterogeneous network environment.

22. (currently amended): A method as recited in claim 18, wherein either said first ~~target~~ wireless device or said second ~~mobile~~ wireless device is configured for sending or receiving beacon frames as said first ~~target~~ wireless device and said second ~~mobile~~ wireless device communicate with one another ~~communicatively couple~~.

23. (currently amended): A method as recited in claim 18, wherein proximity motion is detected in response as said second wireless device is maneuvered towards said first ~~target~~ wireless device, wherein the distance between said first ~~target~~ wireless device and said second ~~mobile~~ wireless device is ~~substantially~~ reduced from equal to or greater than approximately 30 centimeters to less or equal to approximately 15 centimeters ~~while the strength of the signal between said second mobile wireless device and said first wireless device increase~~.

Appl. No.: 10/814,419
Amdt. Dated: 04/12/2006
Off. Act. Dated: 01/12/2006

24. (currently amended): A method as recited in claim 18:[[,]]

wherein said ~~regressively analyzing the strength of the signal comprises~~ signal strength of beacon frames is continuously monitored to accumulate a plurality of signal strength measurements; and

wherein regression analysis is performed as a function of time on accumulated signal strength measurements ~~continuously monitoring the strength of the signal of the beacon frames received~~ at a receiving device of either said first ~~target~~ wireless device or said second ~~mobile~~ wireless device to determine if ~~one of~~ the two wireless devices [[is]] are in proximity motion in relation to one another ~~with the other~~.

25. (currently amended): A method as recited in claim 24, wherein said regressively analyzing ~~the strength of the signal~~ said monitored signal strength further comprises calculating [[the]] a difference between the strength of the signal at a designated time with respect to a time prior to the designated time to determine the strength of the signal as said second ~~mobile~~ wireless device approaches said first ~~target~~ wireless device.

26. (currently amended): A method as recited in claim 25, wherein [[the]] regressively analyzing ~~the strength of the signals~~ said monitored signal strength further ~~comprise~~ comprises linearly analyzing [[the]] a difference in signal strength for said accumulated ~~a recorded set of~~ signal strength information with respect to the number of sample signals within the accumulated signal strength information over a period of time ~~during a proximity motion detection~~.

27. (currently amended): A method as recited in claim 26, further comprising calculating a regression coefficient of the difference in the signal strength of said accumulated ~~the recorded set of~~ signal strength information.

28. (currently amended): A method as recited in claim 27, further comprising calculating a coefficient of determination of the difference in the signal strength for the accumulated ~~recorded set of~~ signal strength information.

29. (currently amended): A method as recited in claim 28, further comprising calculating an increase in the signal strength from the start to the end of a proximity motion by said second ~~mobile~~ wireless device.

30. (currently amended): A method as recited in claim 29, wherein proximity motion of said second ~~mobile~~ wireless device is detected in response to the regression coefficient being found approximately equal to the quotient of the increase in the signal strength divided by the accumulated ~~set of recorded~~ signal strength information.

31. (currently amended): A method as recited in claim [[30]] 29, wherein said proximity motion of said second ~~mobile~~ wireless device is detected in response to the coefficient of determination exceeding ~~being found greater than~~ the regression coefficient.

32. (currently amended): A method as recited in claim [[31]] 27, wherein the increase in the signal strength is pre-calibrated prior to performing the regression analysis on the accumulated ~~set of recorded~~ signal strength information.

33. (currently amended): A method of detecting ~~proximity~~ motion between a first ~~receiving~~ wireless node and a second ~~sending~~ wireless node, comprising:

continuously monitoring beacon frames transmitted by [[the]] said second ~~sending~~ wireless node to [[the]] said first ~~receiving~~ wireless node;

recording [[the]] signal strength information contained in the beacon frames ~~frame~~ transmitted by [[the]] said second ~~sending~~ wireless node;

retaining accumulated ~~the recorded~~ signal strength information in [[the]] said first ~~receiving~~ wireless node ~~for a designated period of time~~; and

regressively analyzing the ~~retained~~ accumulated signal strength information within a given time interval to determine if [[the]] proximity motion of [[the]] said second ~~sending~~ wireless node with respect to [[the]] said first ~~receiving~~ wireless node has occurred.

34. (currently amended): A method as recited in claim 33, wherein the regressively analyzing [[of]] the ~~retained~~ accumulated signal strength information comprises calculating [[the]] difference in the signal strength with respect to a ~~sampling~~ signal period over which the signal strength information has been accumulated.

35. (currently amended): A method as recited in claim [[34]] 33, further comprising linearly analyzing [[the]] differences in the signal strength with respect to [[the]] a number of signal strength values which have been accumulated ~~sampled signals~~ to generate a regressive coefficient ~~of the signals sampled~~.

36. (currently amended): A method as recited in claim [[34]] 33, further comprising linearly analyzing [[the]] differences in the signal strength with respect to [[the]] a number of signal strength values which have been accumulated ~~sampled signals~~ to generate a ~~regression~~ coefficient of determination ~~of the signals sampled~~.

37. (currently amended): A method as recited in claim 36, further comprising calculating the increase in signal strength from the start to the end of accumulated signal strength information to detect a proximity motion of said first and said second ~~of a mobile wireless device with respect to a fixed~~ wireless ~~device~~ devices with respect to one another.

38. (currently amended): A method as recited in claim 37, wherein proximity motion is detected in response to said [[a]] regression coefficient of approximately 0.70.

39. (currently amended): A method as recited in claim 37, wherein proximity motion is detected in response to said [[a]] regression coefficient of approximately 0.75.

40. (currently amended): A method as recited in claim 37, wherein proximity motion ~~of a mobile wireless device with respect to a fixed wireless device~~ is detected in response to a proximity regression coefficient that exceeds a predetermined threshold value.

41. (currently amended): A method as recited in claim 40, further comprising pre-calibrating the increase in signal strength prior to using increases in the signal strength by the regression analysis scheme to determine proximity motion between said first and said second wireless devices ~~of the mobile wireless device with respect to the fixed wireless device~~.

42. (currently amended): A method of detecting motion in a mobile wireless device ~~proximity motion~~ with respect to a stationary wireless device in a wireless network, the method comprising:

~~calculating signal strength fluctuations between the mobile wireless device and the stationary wireless device during proximity motion;~~

calculating ~~analyzing the~~ signal strength difference between the mobile wireless device and the stationary wireless device as the mobile wireless device approaches the stationary wireless device; [[and]]

regressively analyzing ~~the difference in the~~ signal strength differences ~~with respect to the recorded signal strength information~~ during a signal sampling period; and

determining, based on the regressively analyzing, ~~to determine~~ whether the mobile wireless device has moved into ~~is in~~ proximity ~~motion~~ with ~~respect to~~ the stationary wireless device within a given period of time or number of signal strength samples.

43. (currently amended) A method as recited in claim 42, wherein the stationary wireless device and the mobile wireless device are configured in IBSS mode with one of the fixed wireless device and the mobile wireless device being configured as [[a]] an access point node.

44. (currently amended): A method as recited in claim 42, ~~further comprising~~ wherein calculating the ~~difference in~~ signal strength difference between the mobile wireless device and the fixed wireless device ~~difference~~ is performed with respect to accumulated signal strength information within a plurality of recorded ~~sample~~ signal strength samples ~~information~~.

45. (currently amended): A method as recited in claim 44, wherein said regressively analyzing comprises ~~further comprising~~ performing a linear regression analysis on the difference in signal strengths on the signals transmitted between the mobile wireless device and the fixed wireless device with respect to the number of samples ~~signals in a given sample~~ to determine a regression coefficient of the signal strengths.

46. (currently amended): A method as recited in claim 45, wherein said regressively analyzing comprises ~~further comprising~~ performing a linear regression analysis on the difference in signal strengths on the signals transmitted between the mobile wireless device and the fixed wireless device with respect to the number of

samples ~~signals in a given sample~~ to determine a coefficient of determination of the signal strength.

47. (currently amended): A method as recited in claim 46, wherein proximity motion of the mobile wireless device relative to the fixed wireless device is detected in response to the coefficient of determination exceeding a [[the]] threshold value ~~for the coefficient of determination~~.

48. (currently amended): A method as recited in claim 47, wherein the threshold value for [[of]] the coefficient of determination is approximately 0.70.

49. (currently amended): A method as recited in claim 47, wherein the threshold value for the [[of]] coefficient of determination is approximately 0.75.